Can Eating Fruits and Vegetables Help Manage Weight?

Jennifer Seymour, PhD
Epidemiologist
Centers For Disease Control and Prevention

Understand potential role fruits and vegetables play in prevention and reduction of overweight and obesity
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Outline

- Why fruits and vegetables for weight management?
- What does the research tell us?
- What can we learn from other evidence?
- What are the caveats?

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Why?
Overweight and Obesity Are Epidemic in the United States
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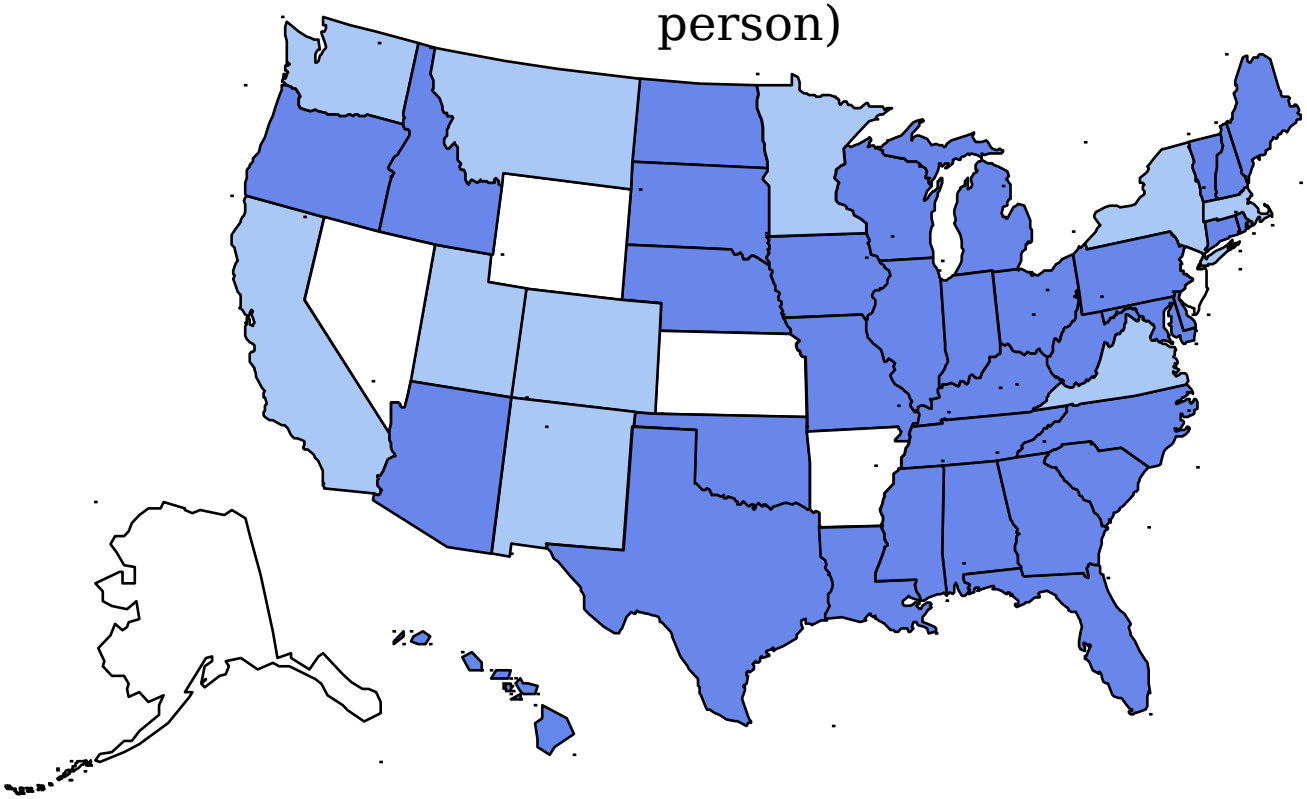
Obesity* Trends Among U.S. Adults

BRFSS, 1990

(*BMI ≥ 30, or ~ 30 lbs overweight for 5’4” person)



Source: Behavioral Risk Factor Surveillance System, CDC

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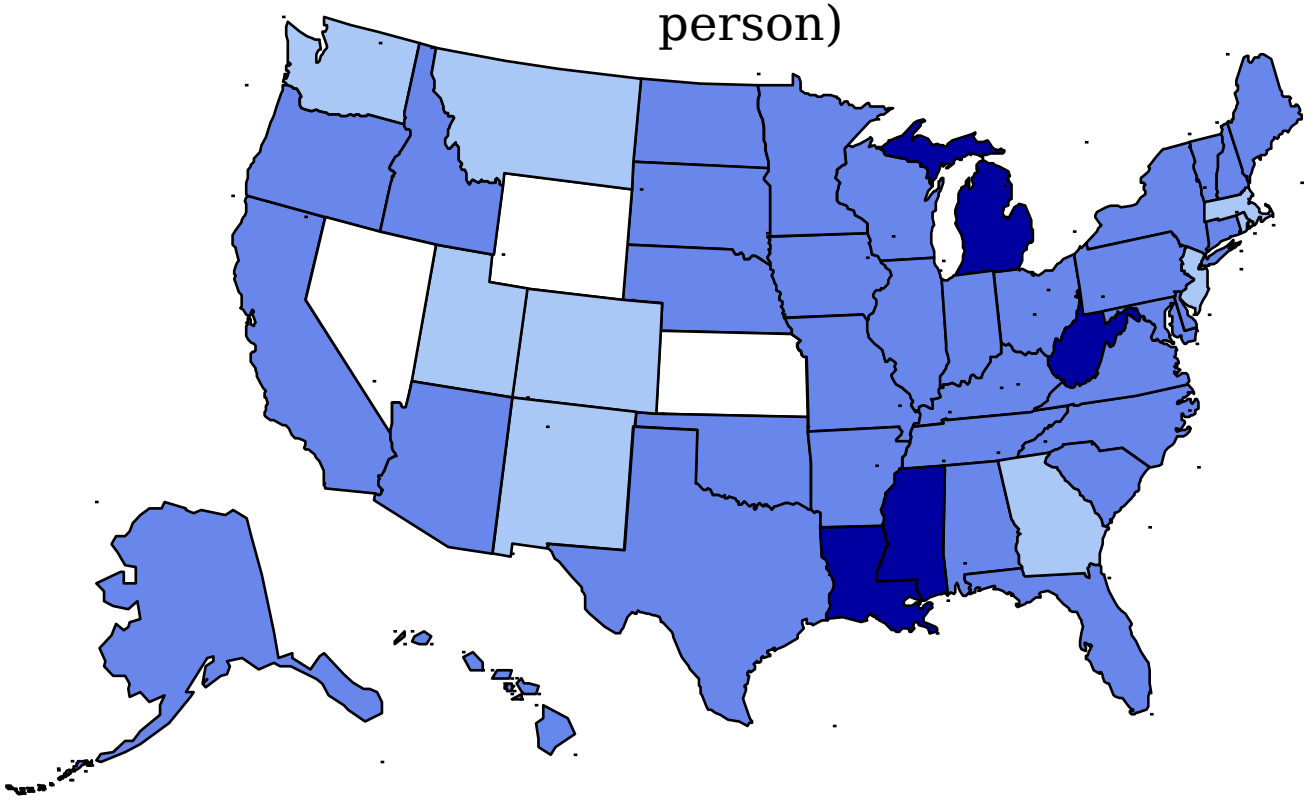

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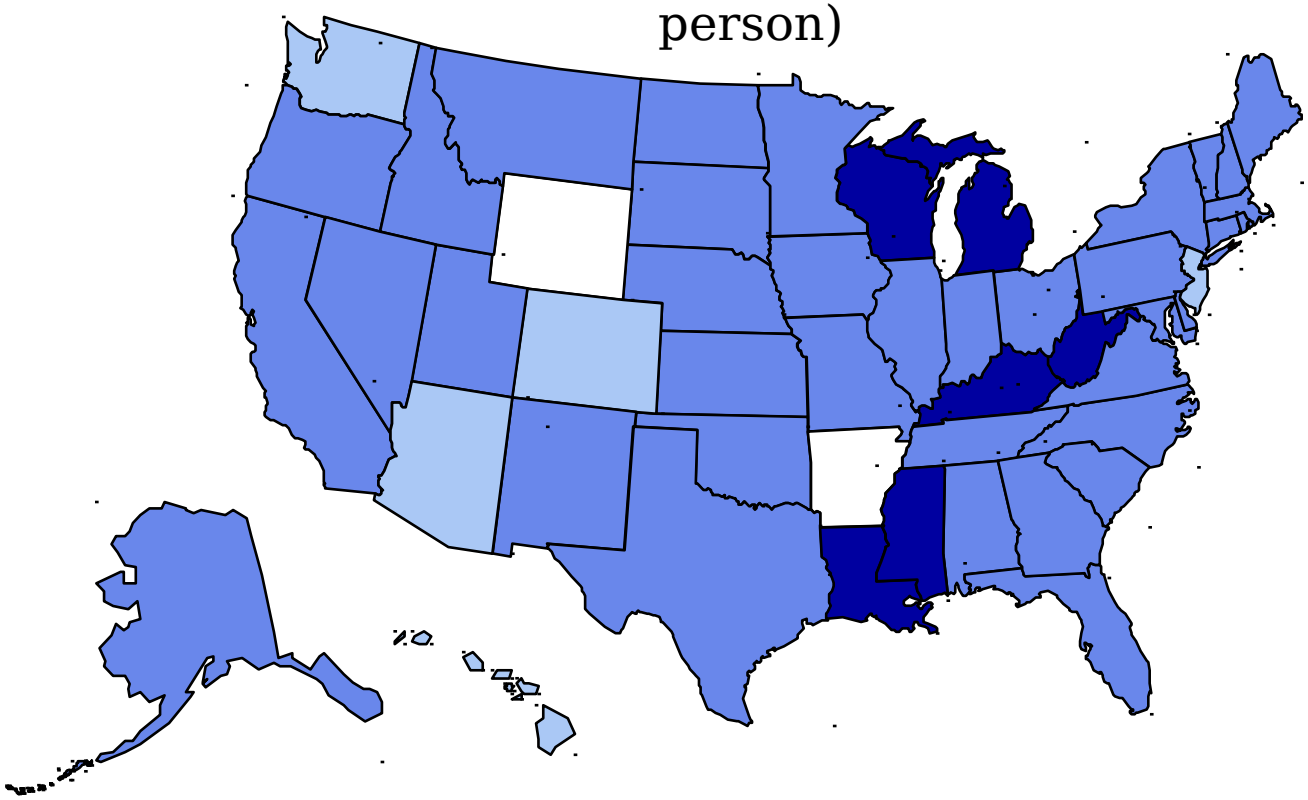

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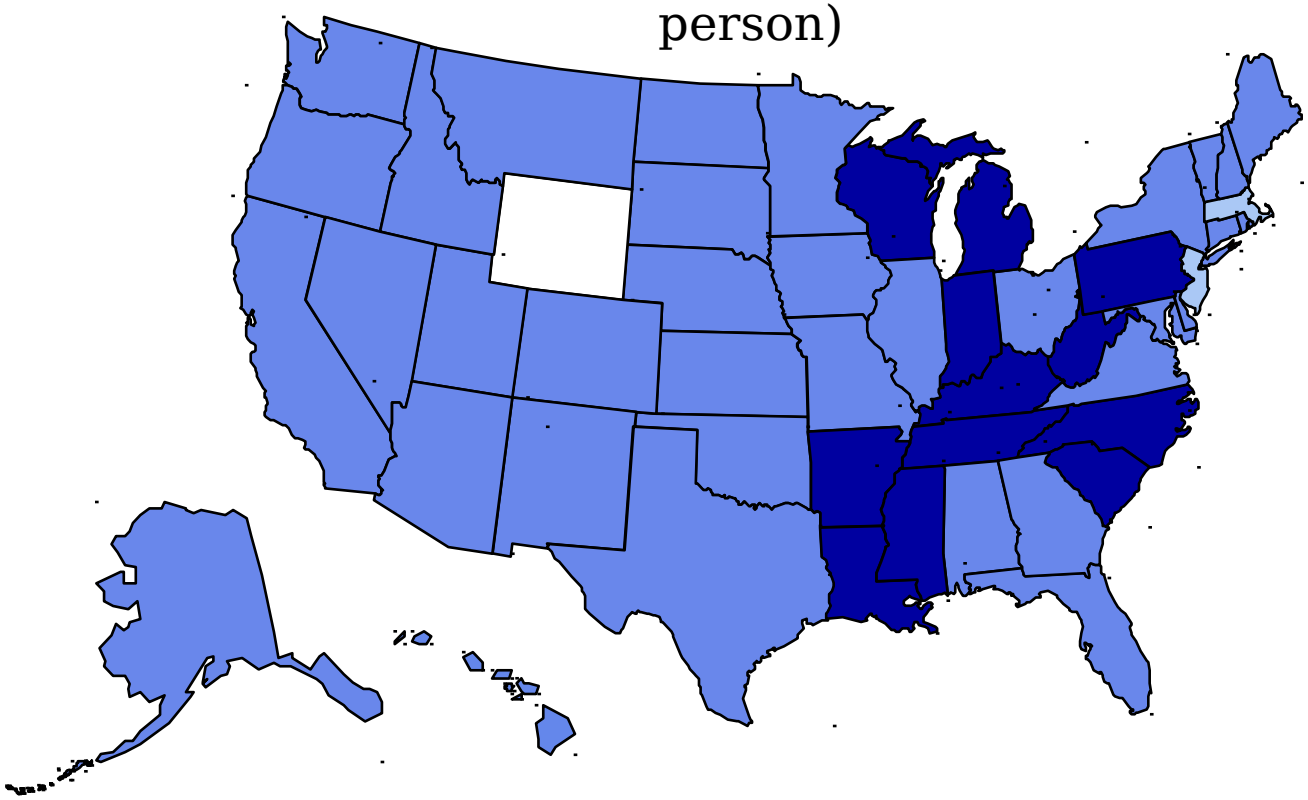

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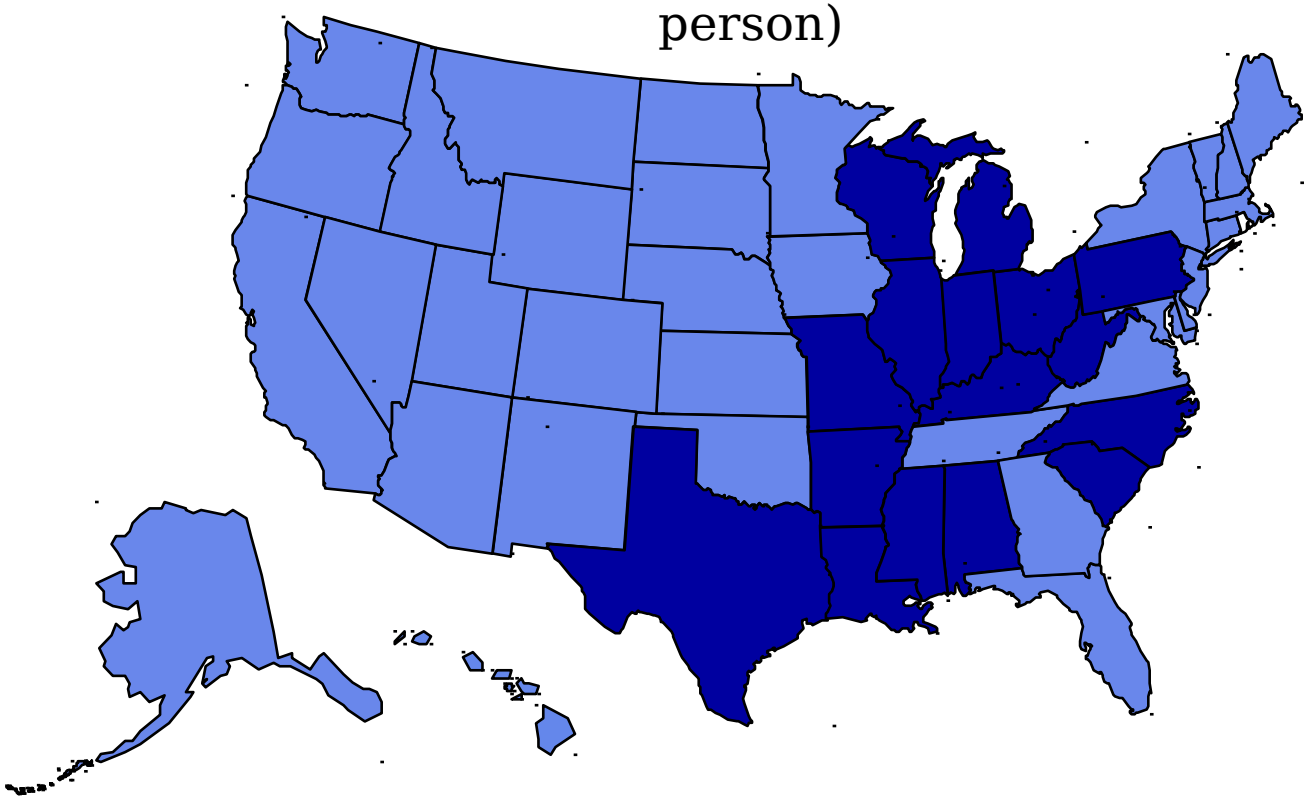

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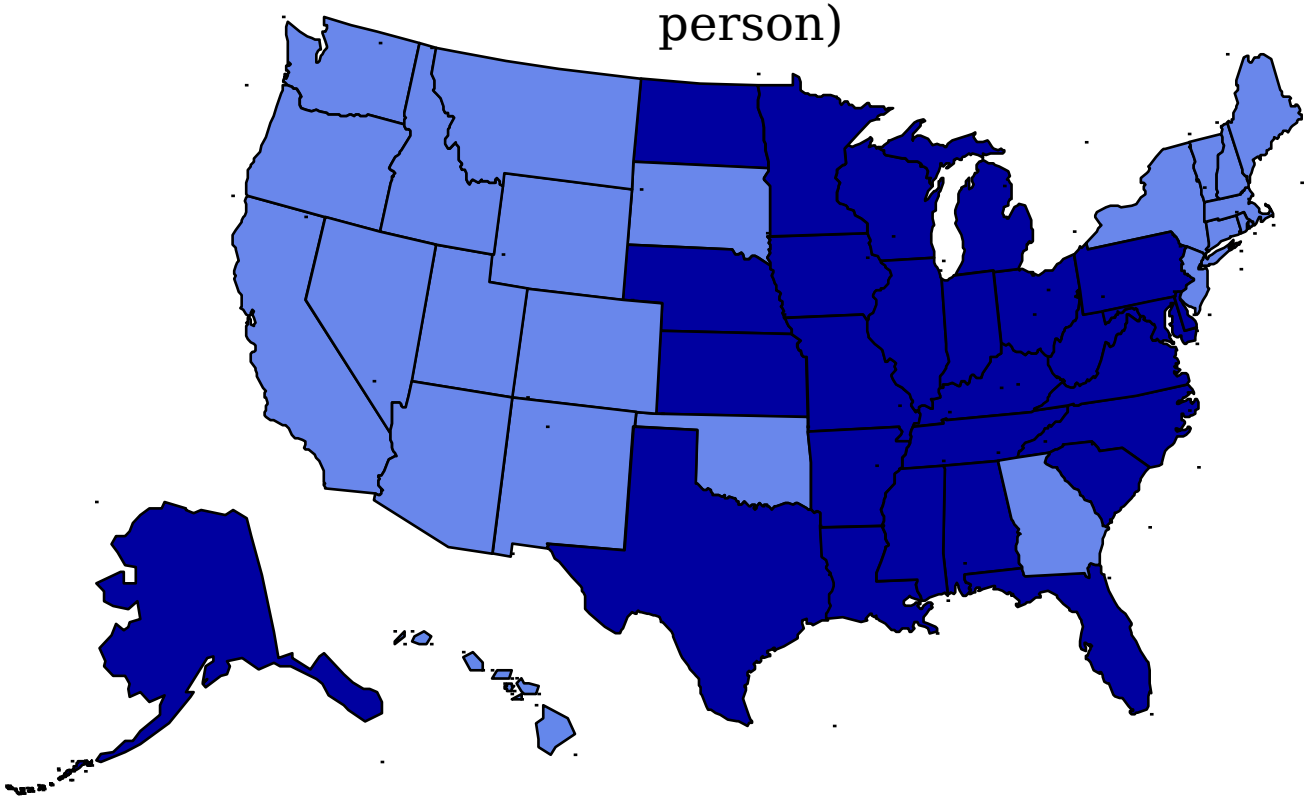

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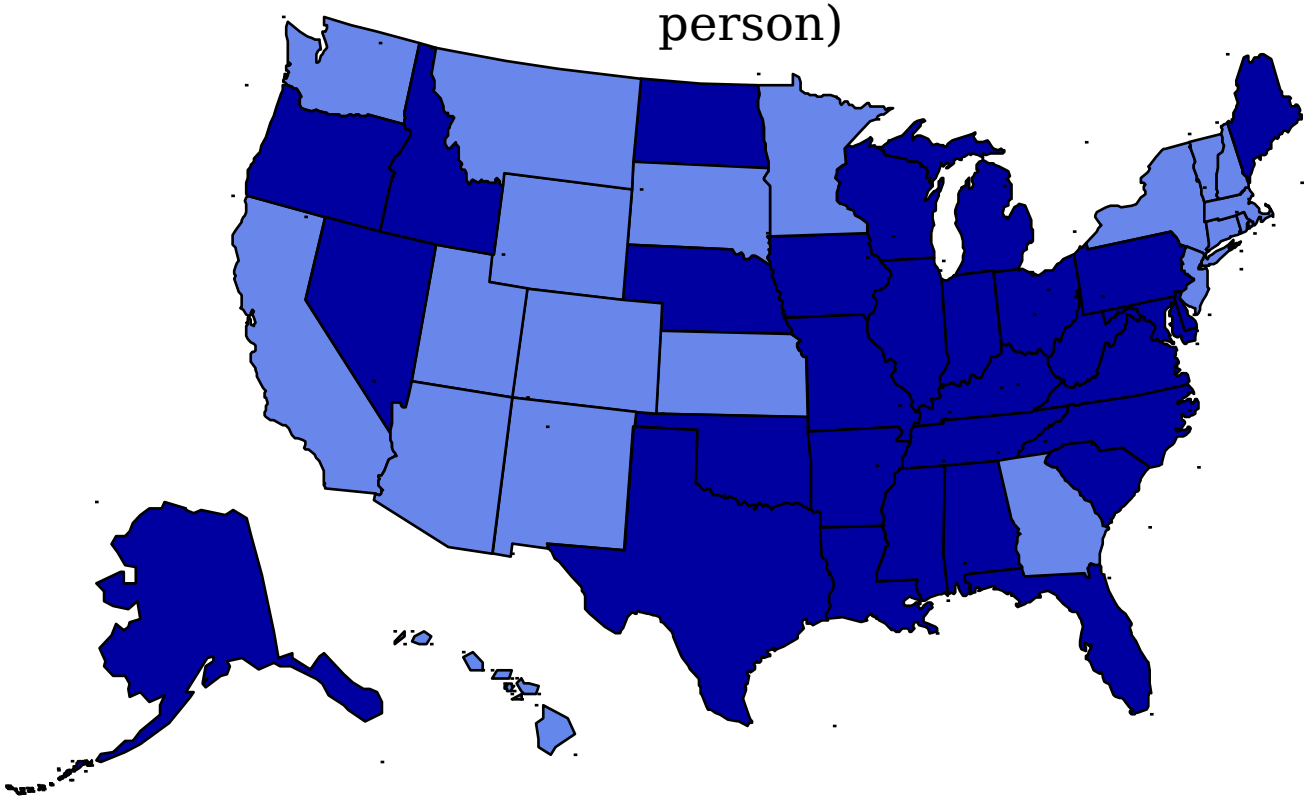

Source: Behavioral Risk Factor Surveillance System, CDC

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Obesity* Trends Among U.S. Adults

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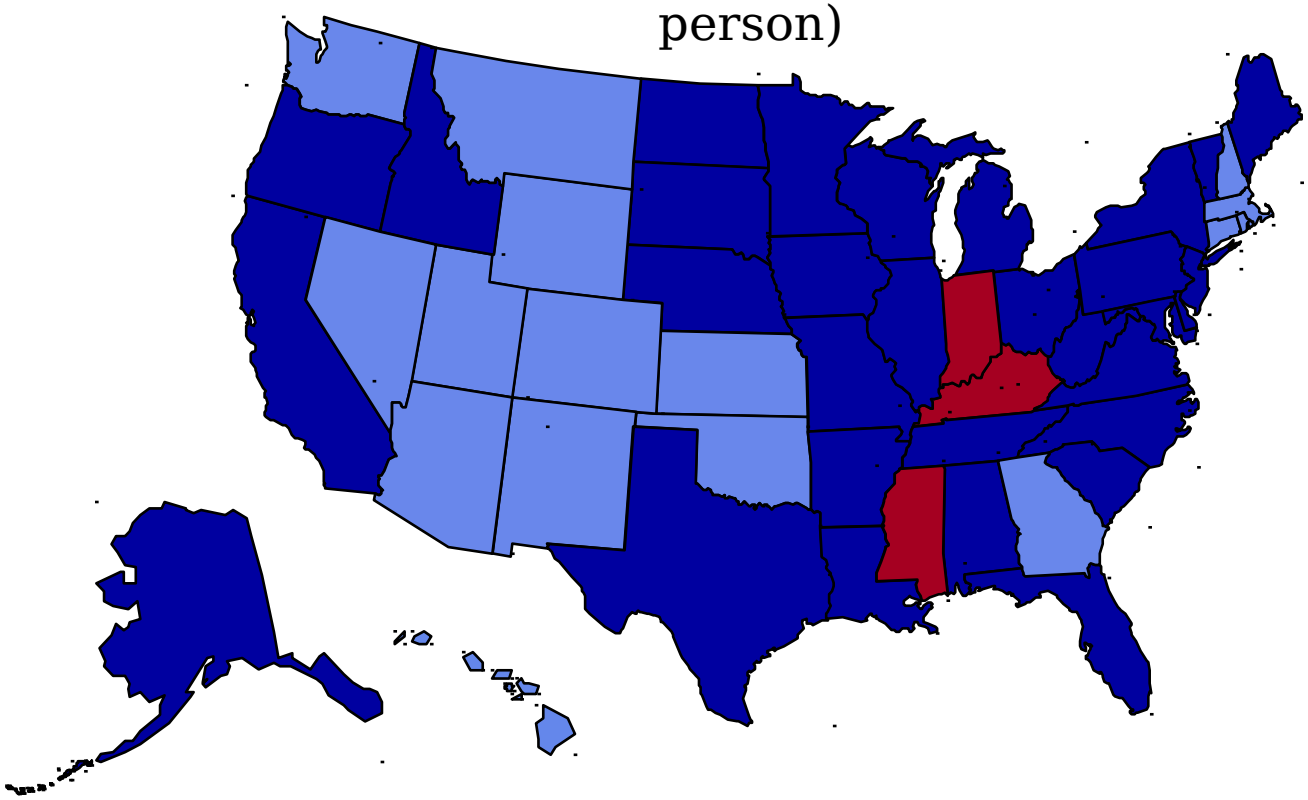

Source: Behavioral Risk Factor Surveillance System, CDC

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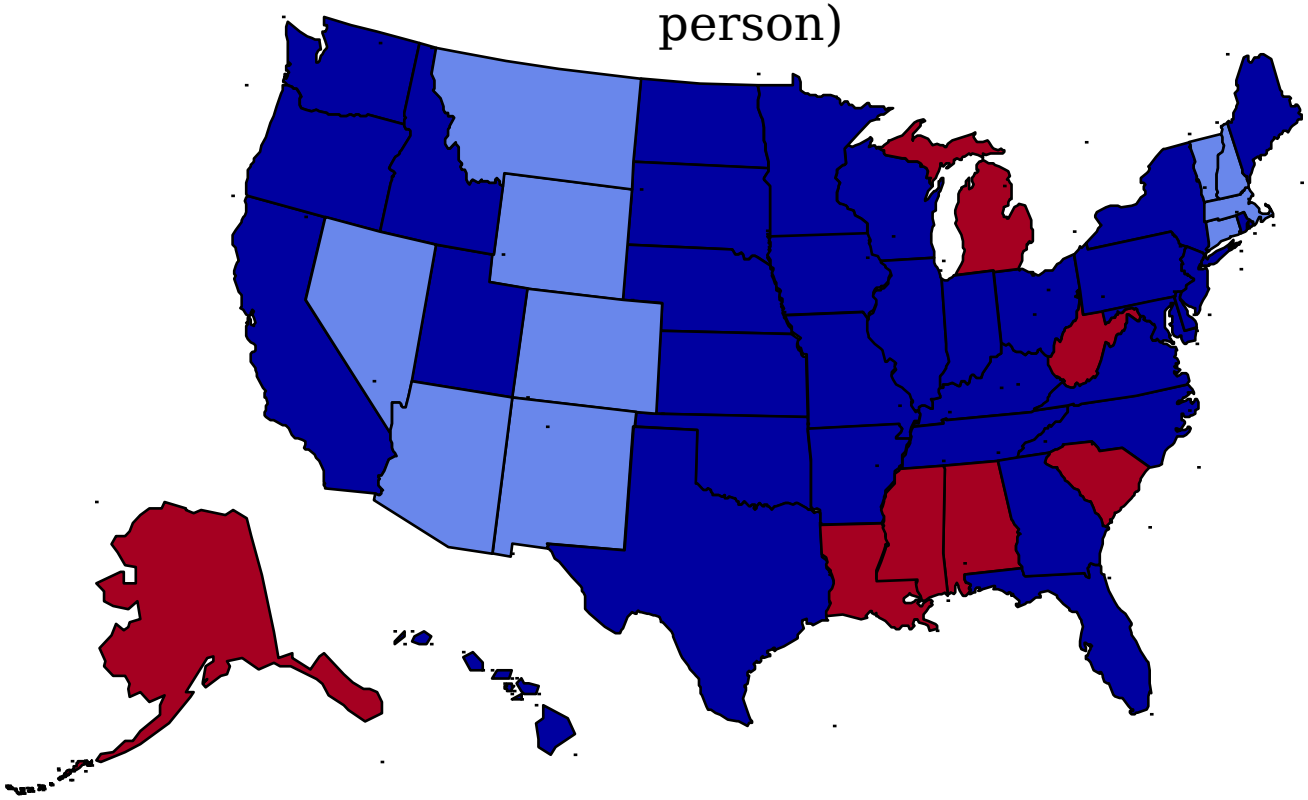

Source: Behavioral Risk Factor Surveillance System, CDC

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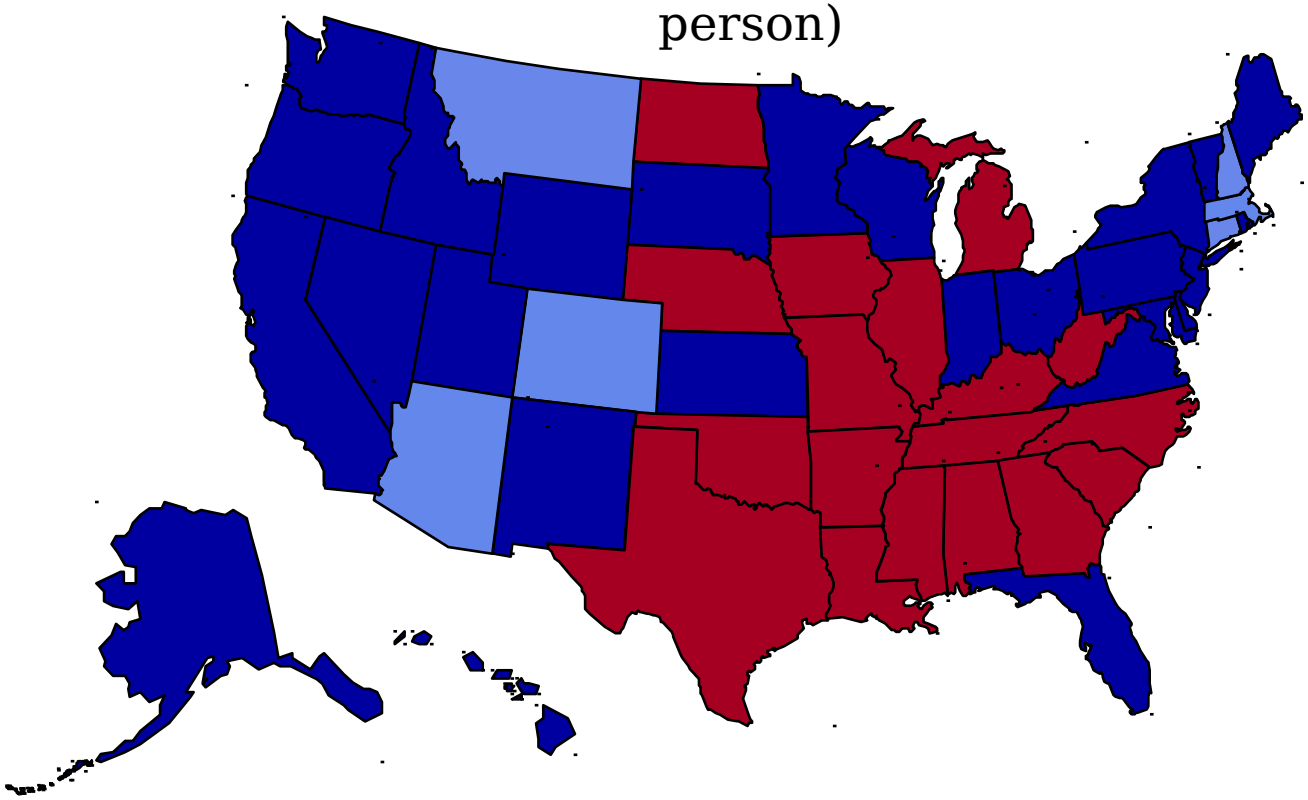

Source: Behavioral Risk Factor Surveillance System, CDC

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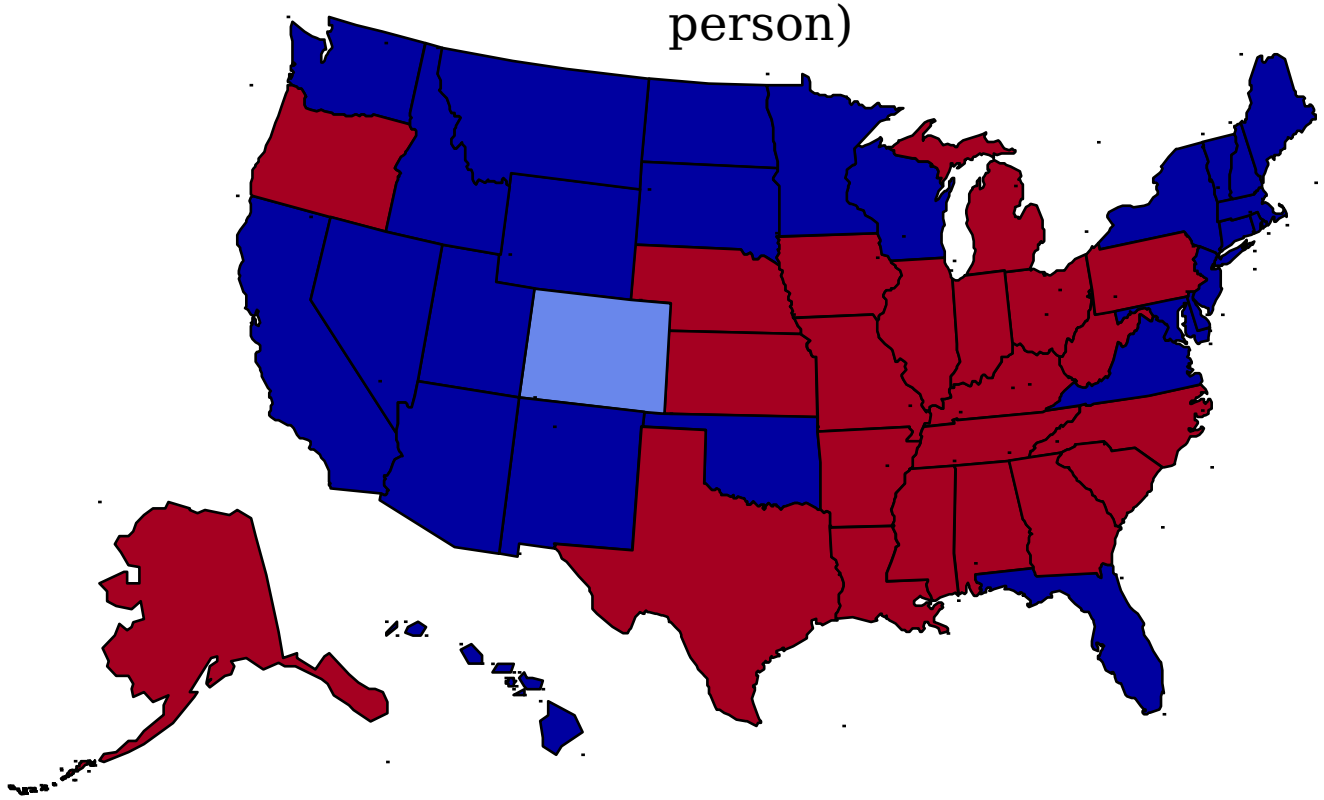
Obesity* Trends Among U.S. Adults

BRFSS, 2000

(*BMI ≥ 30, or ~ 30 lbs overweight for 5’4” person)



Source: Behavioral Risk Factor Surveillance System, CDC

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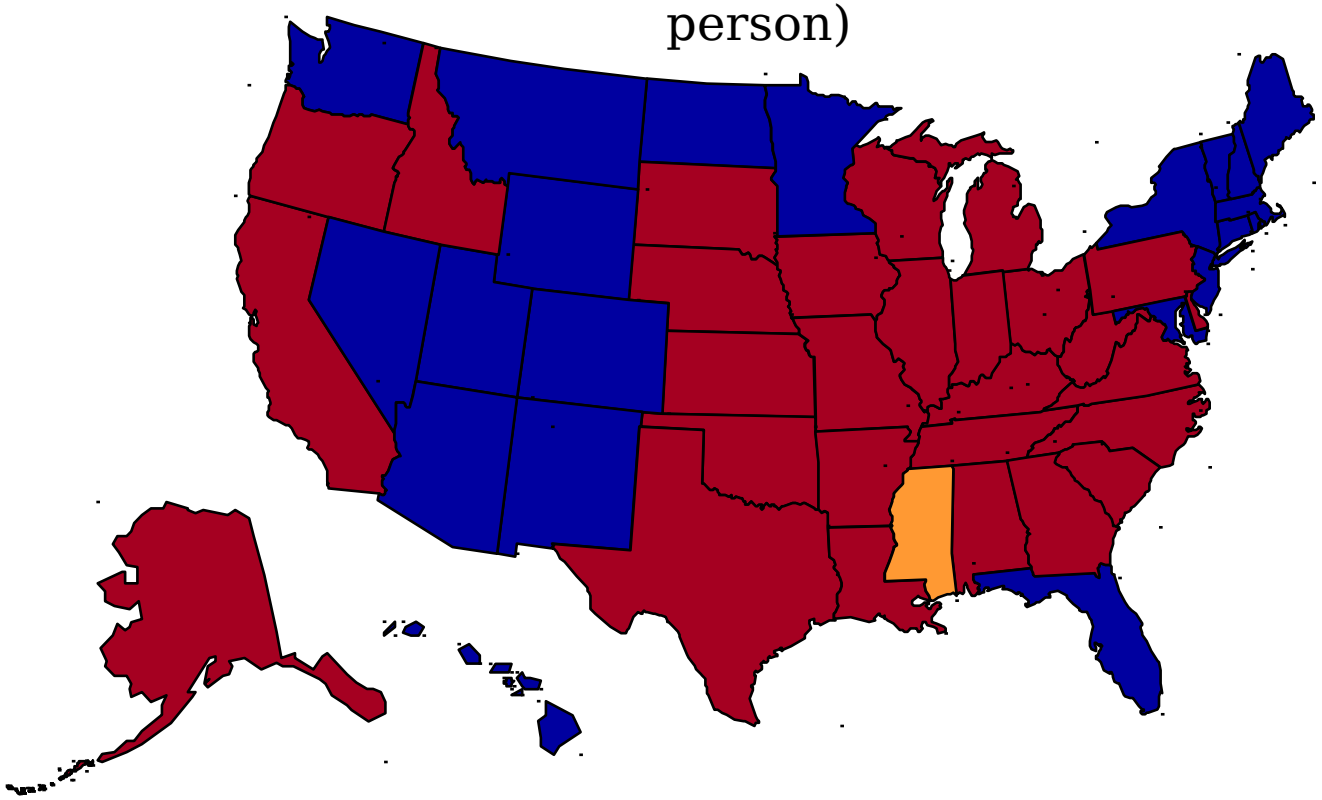
Obesity* Trends Among U.S. Adults

BRFSS, 2001

(*BMI ≥ 30, or ~ 30 lbs overweight for 5’4” person)



Source: Behavioral Risk Factor Surveillance System, CDC

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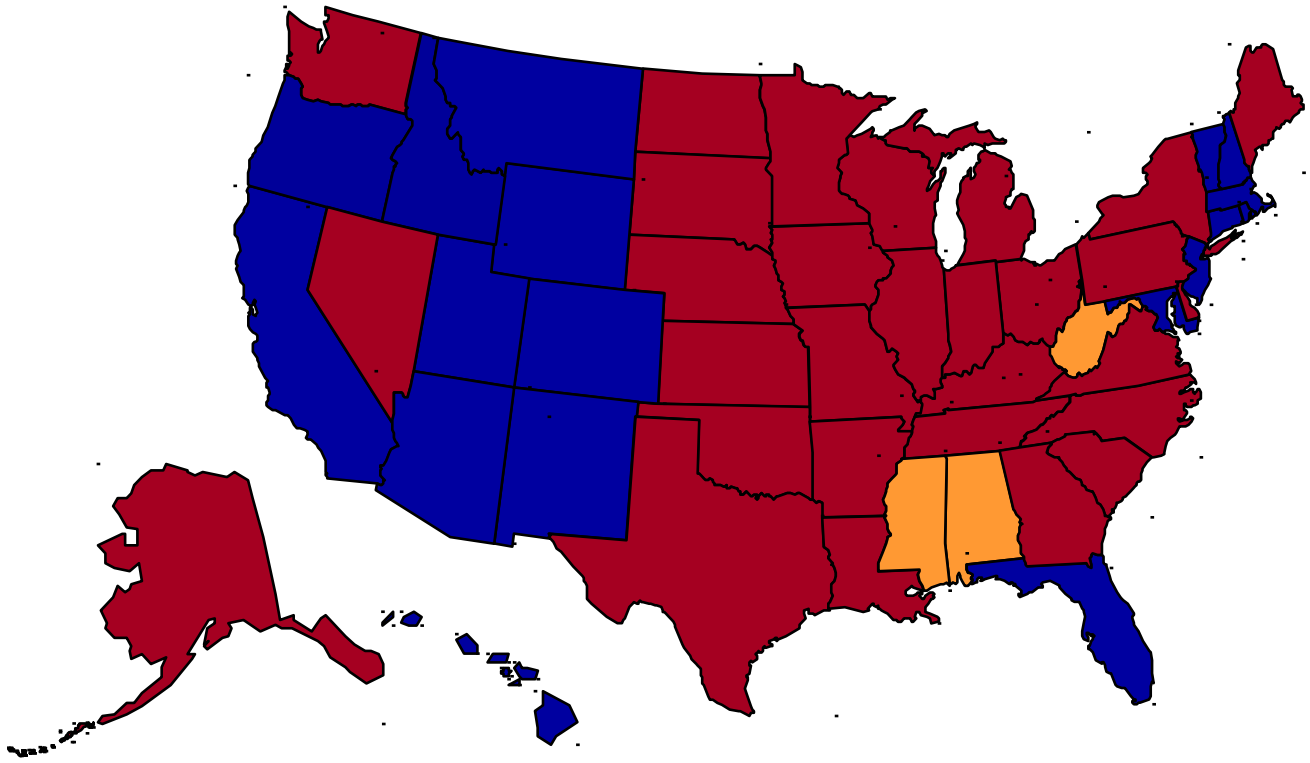
Obesity* Trends Among U.S. Adults

BRFSS, 2002

(*BMI ≥ 30, or ~ 30 lbs overweight for 5’4” person)



Source: Behavioral Risk Factor Surveillance System, CDC

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Actual Causes of Death

Tobacco	435,000
Overweight and Obesity	**400,000**
Alcohol	85,000
Microbial Agents	75,000
Toxic Agents	55,000
Motor Vehicles	43,000
Firearms	29,000
Sexual Behavior	20,000
Illicit Drug Use	17,000

Mokdad. “Actual Causes of Death in the US, 2000” JAMA, 2004, vol 291

Why?
Fruits and Vegetables Help
Prevent Disease and
Provide Nutrients
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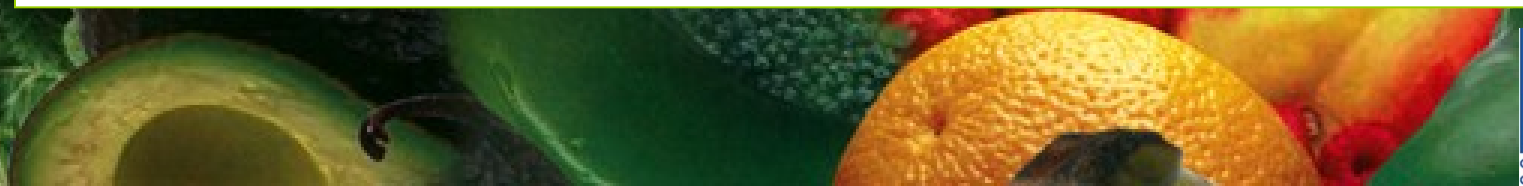
Current evidence collectively demonstrates that fruit and vegetable intake is associated with improved health, reduced risk of major diseases and possibly delayed onset of age-related indicators.

Hyson (2002)



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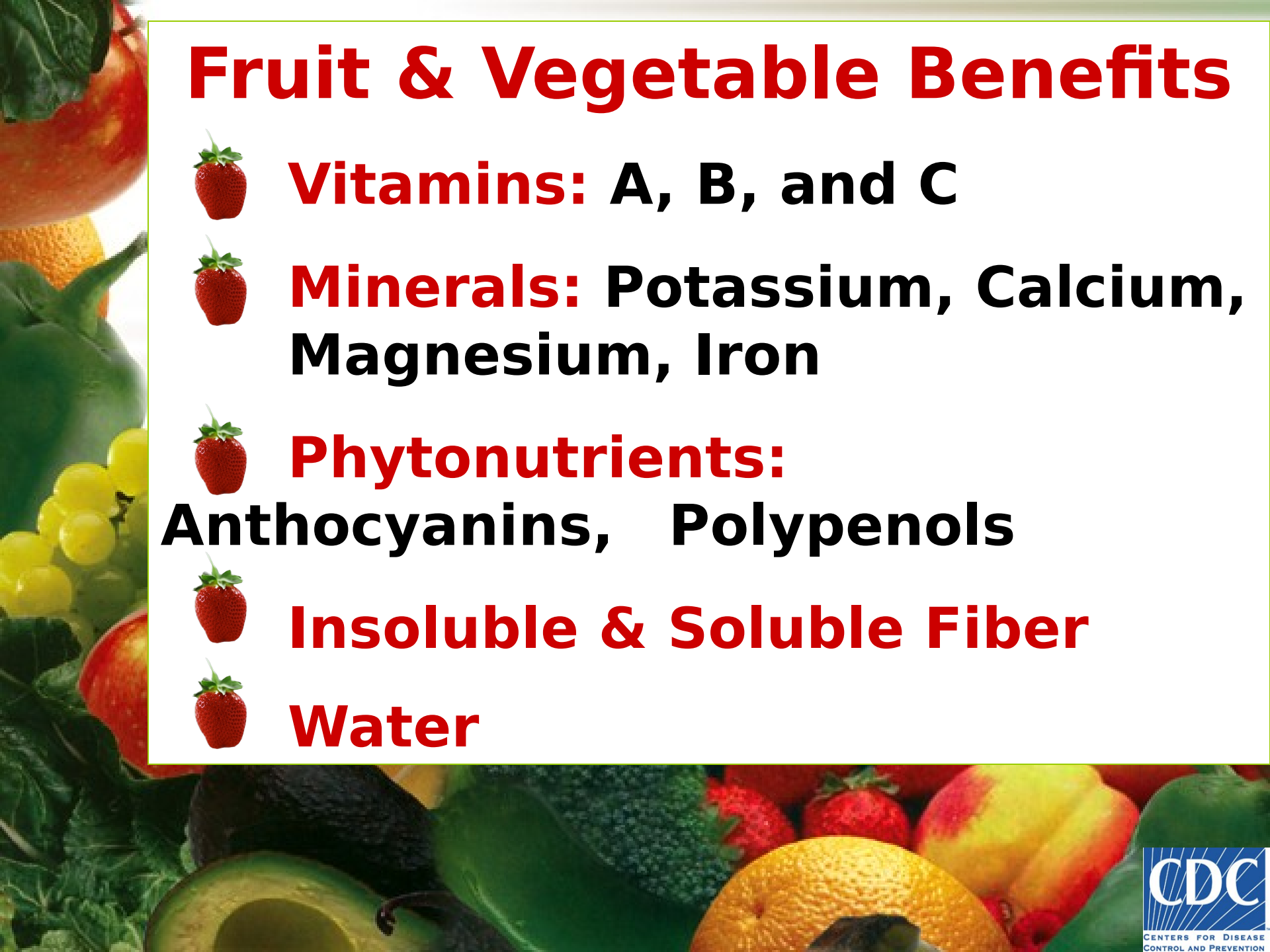
Fruit & Vegetable Benefits

- **Vitamins:** A, B, and C
- **Minerals:** Potassium, Calcium, Magnesium, Iron
- **Phytonutrients:** Anthocyanins, Polypenols
- **Insoluble & Soluble Fiber**
- **Water**



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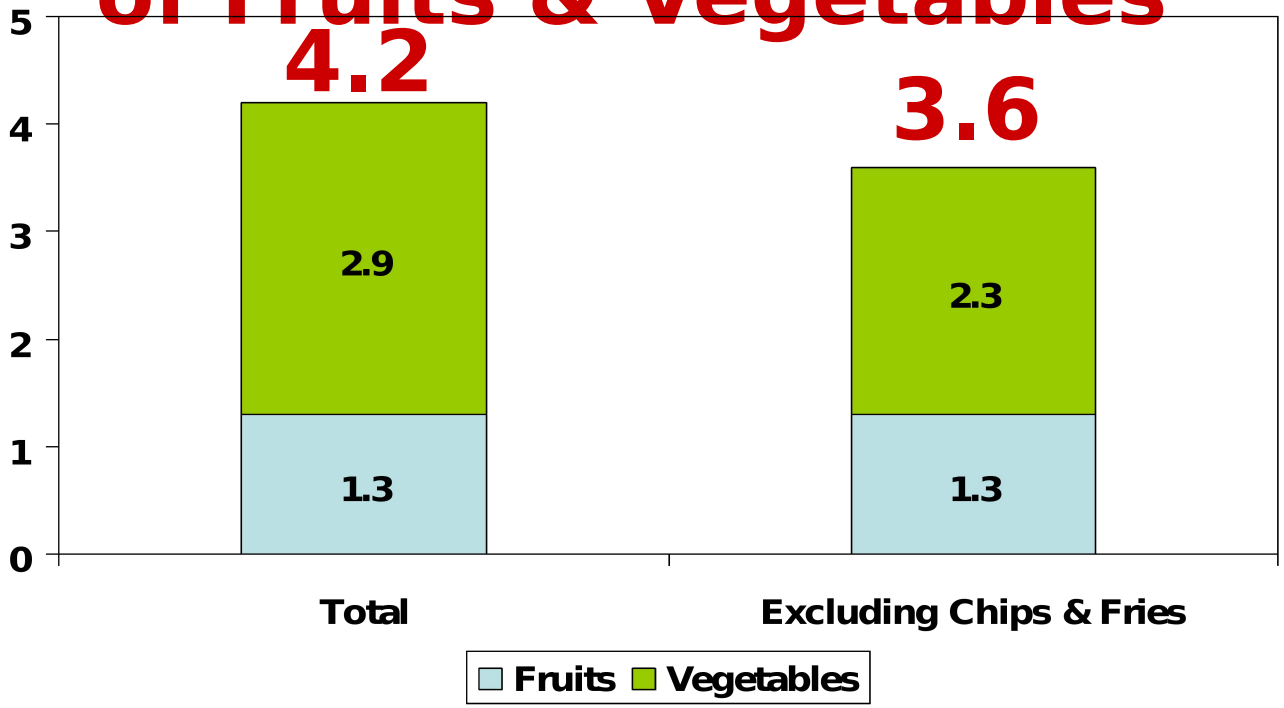
The Color Message
Reaches Everyone

You Can't Eat Your Colors Without Eating A Variety of Nutrients and Multiple Servings

** Eat fruits and vegetables as part of a total diet low in fat, saturated fat and cholesterol and in substitution of higher energy density foods.*

Average U.S. Daily Servings of Fruits & Vegetables



NPD Research (N=5100)

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How Americans Eat

- 1 in 5 Americans eats 5 A Day

- 89% teen girls and 96% of 2-12 year olds fall short of eating 5 A Day

- Obesity levels lowest among those with high intakes of V & F

NPD Research (N=5100)

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Overweight and Obesity
- Fruits and Vegetables
The Research
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Helpful Definitions

- Satiety – the effects of a food or a meal after eating has ended.
- Satiation – the processes involved in the termination of a meal
- Energy Density – the relationship of calories to the volume of food

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Effects of Fruits and Vegetables on Satiety

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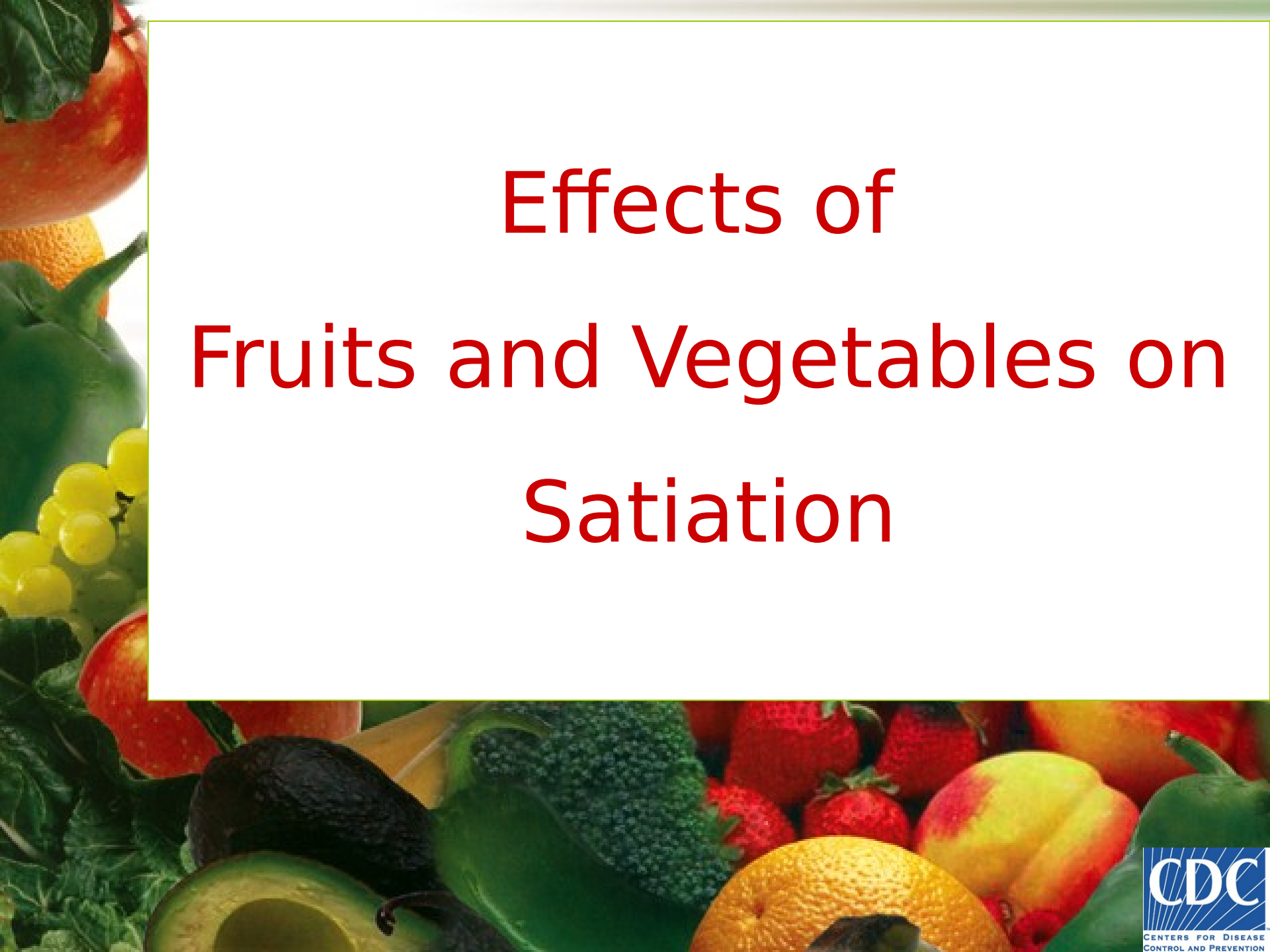
Effects of Fruits and Vegetables on Satiation



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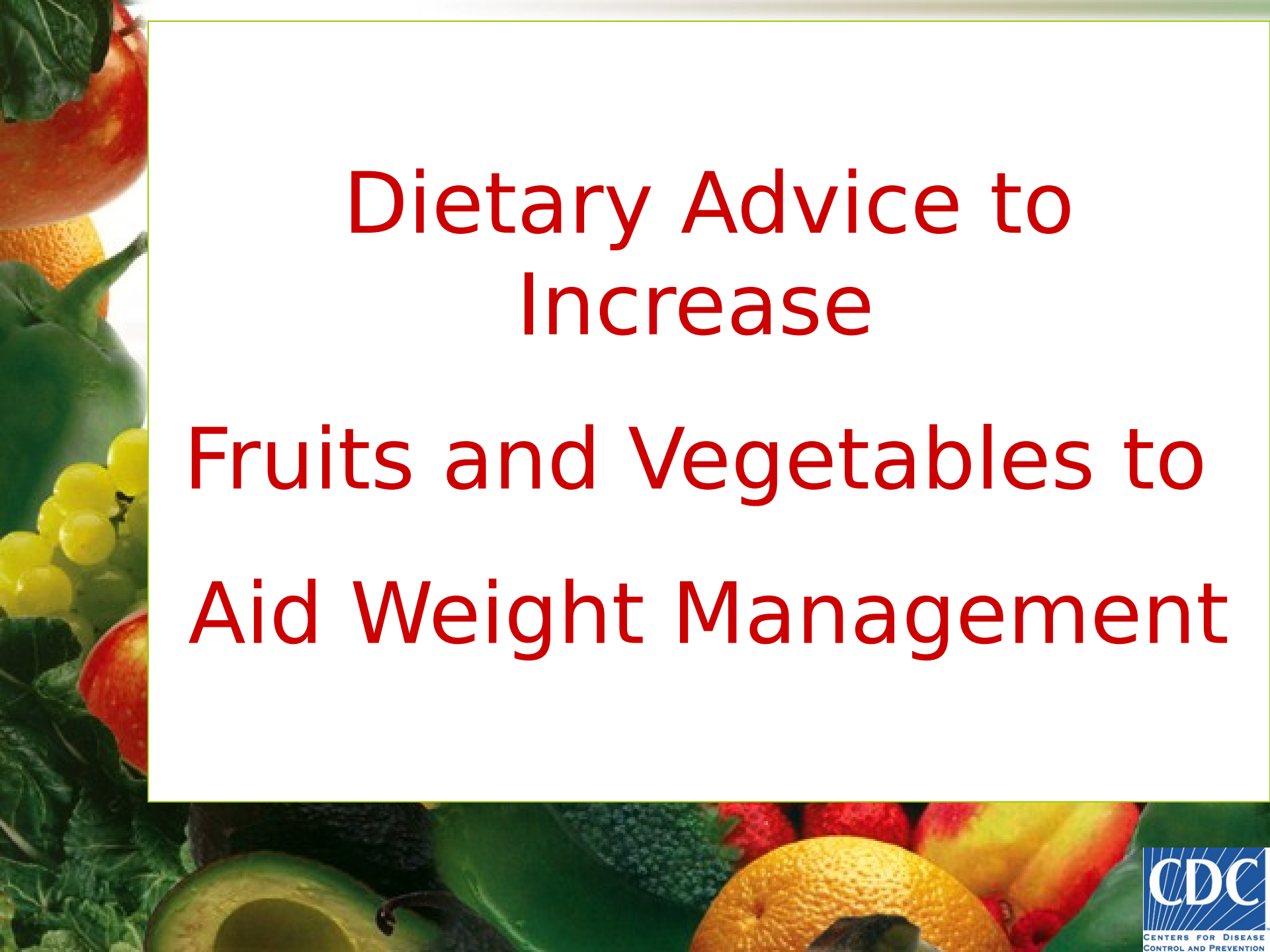

Dietary Advice to Increase Fruits and Vegetables to Aid Weight Management

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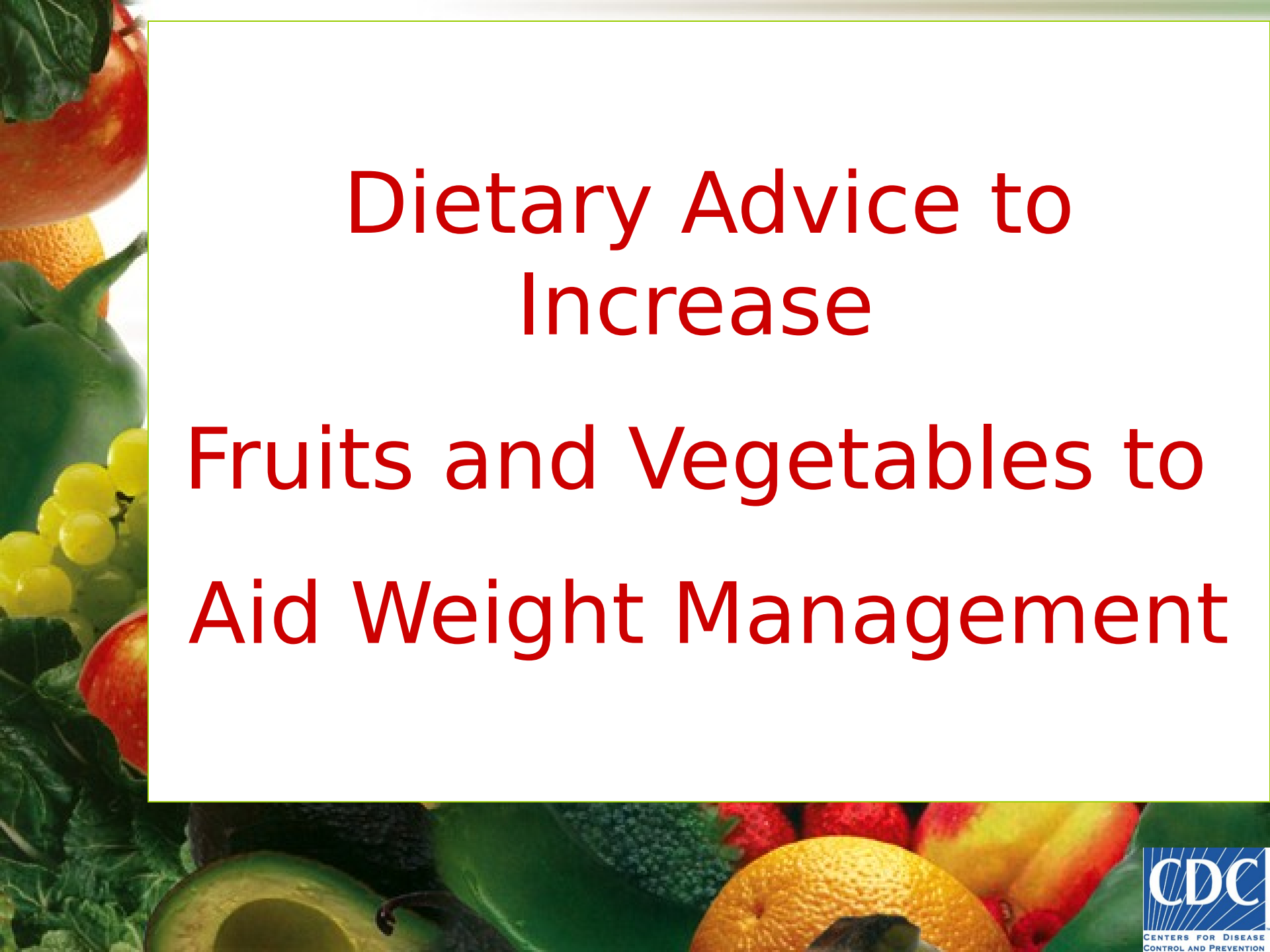

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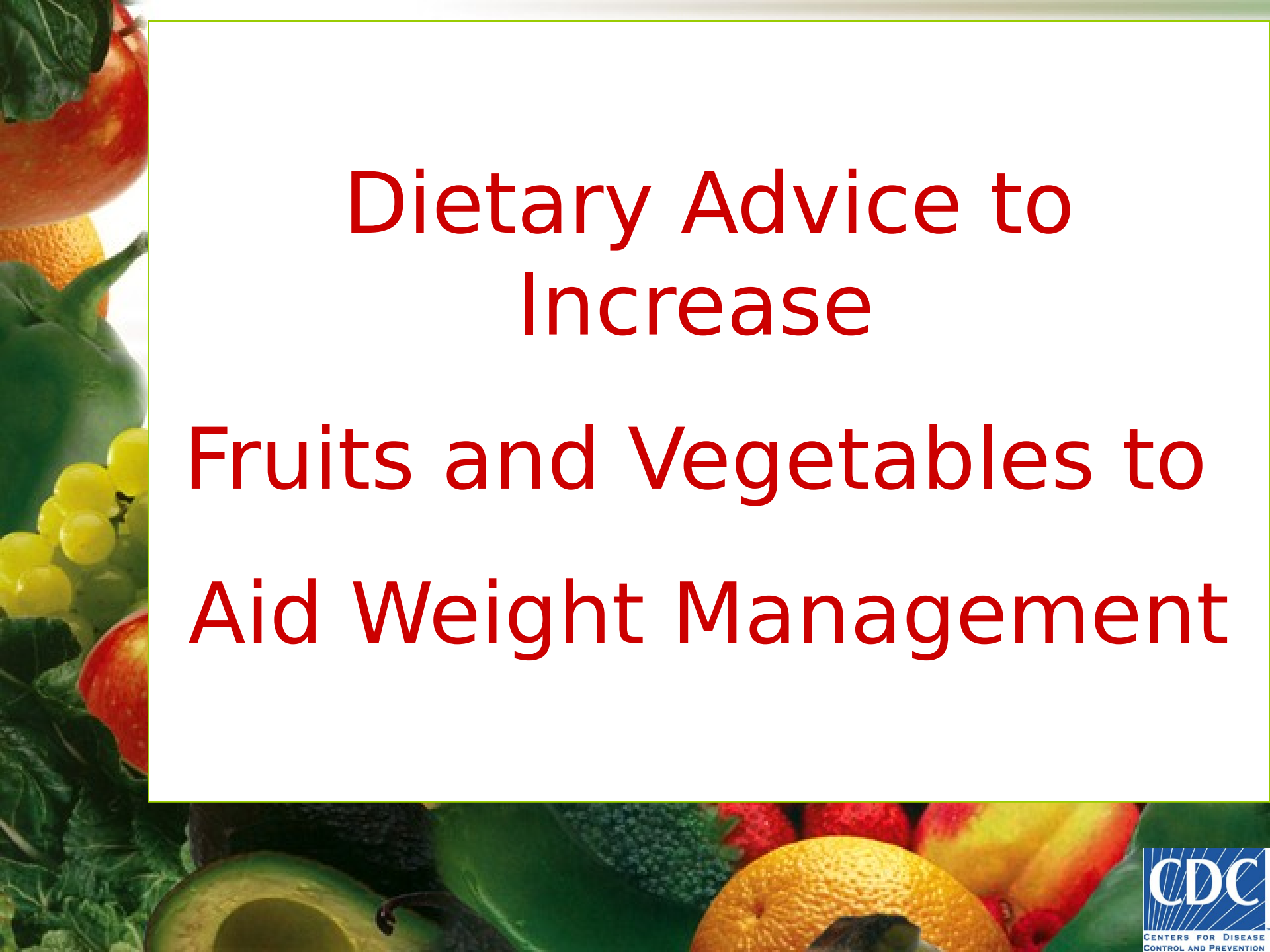

Dietary Advice to Increase Fruits and Vegetables to Aid Weight Management

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Fruit and Vegetable Consumption and Weight in Free-Living Individuals

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Fruit and Vegetable Consumption and Weight in Free-Living Individuals

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Fruit and Vegetable Consumption and Weight in Free-Living Individuals

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Overweight and Obesity - Fruits and Vegetables

Other Evidence

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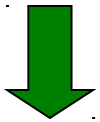
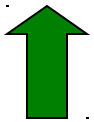
Energy Density (ED)

- Relationship of calories to volume
- ED=Calories/Grams
- Water and fiber  ED
- Fat increases  ED

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Energy Density (ED)

Very low-energy-density <0.6

Low-energy-density 0.6-<1.5

Medium-energy-density 1-<4.0

High-energy-density 4.0-9.0

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Very Low-Energy-Density Foods

- Most fruits and vegetables
- Skim milk
- Broth-based soups

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Low-Energy-Density Foods

- Beans and legumes
- Oatmeal
- Tuna in water
- Bananas

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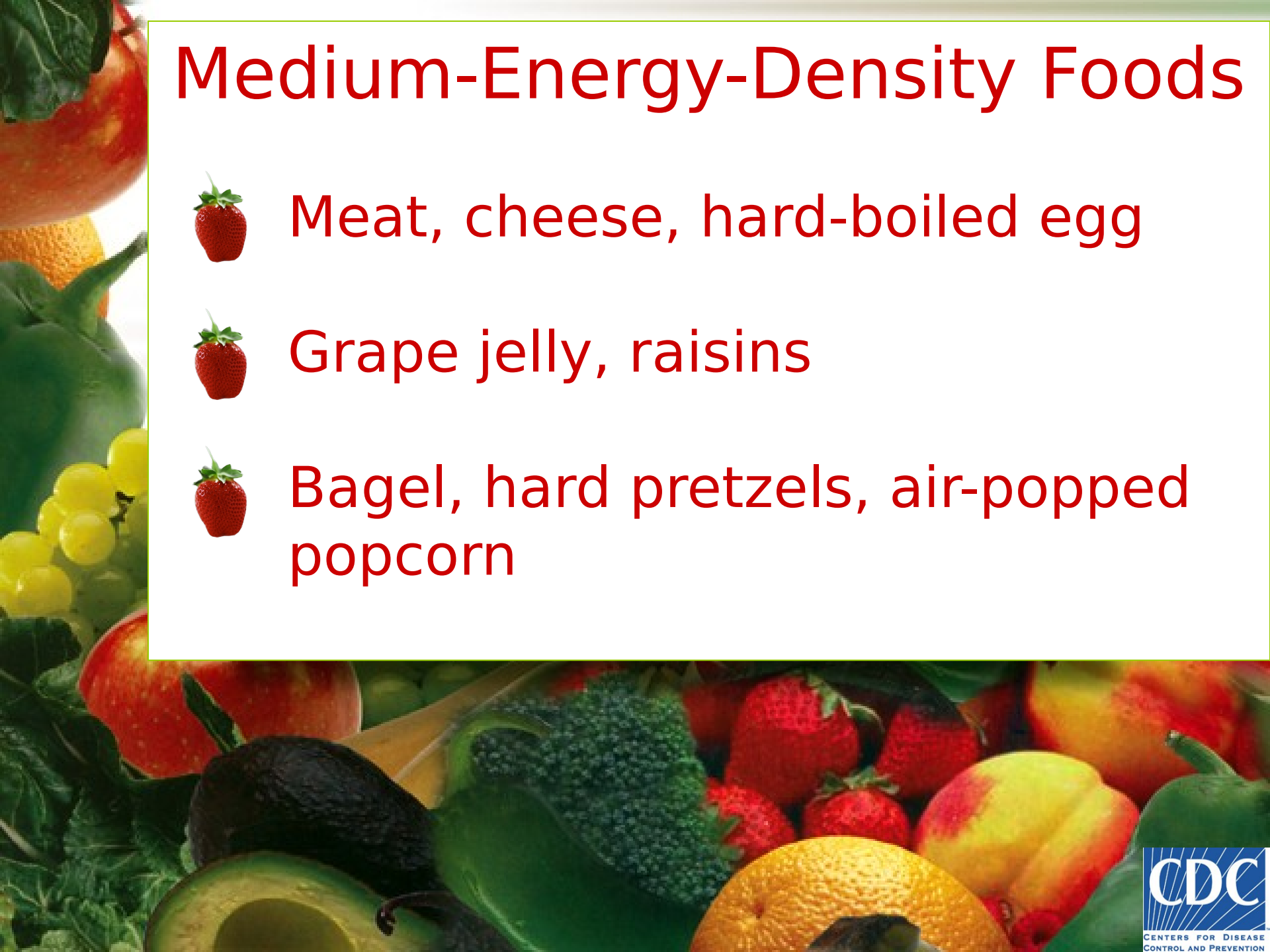
Medium-Energy-Density Foods

- Meat, cheese, hard-boiled egg
- Grape jelly, raisins
- Bagel, hard pretzels, air-popped popcorn



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High-Energy-Density Foods

- Crackers, chips
- Cookies
- Nuts
- Butter, bacon

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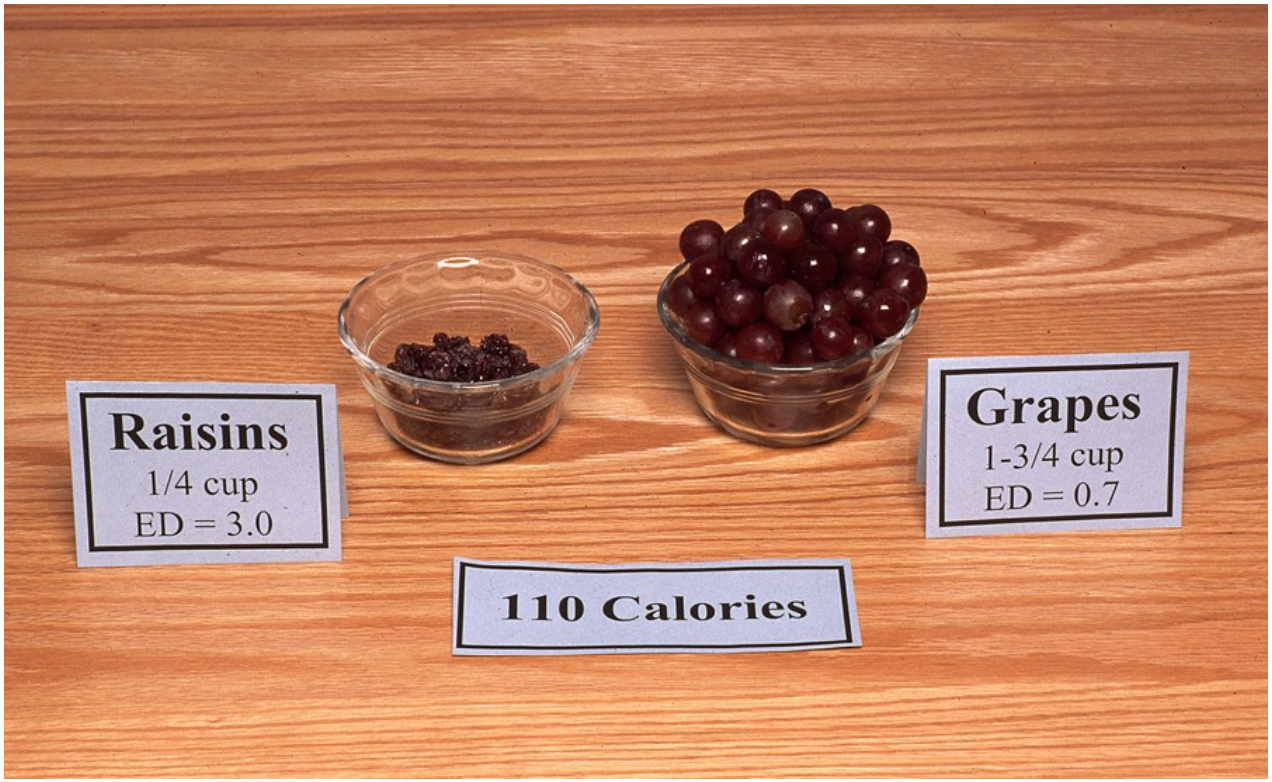
Effect of water content on energy density



Rolls & Barnett, The Volumetrics Weight-Control Plan, Quill, 2000

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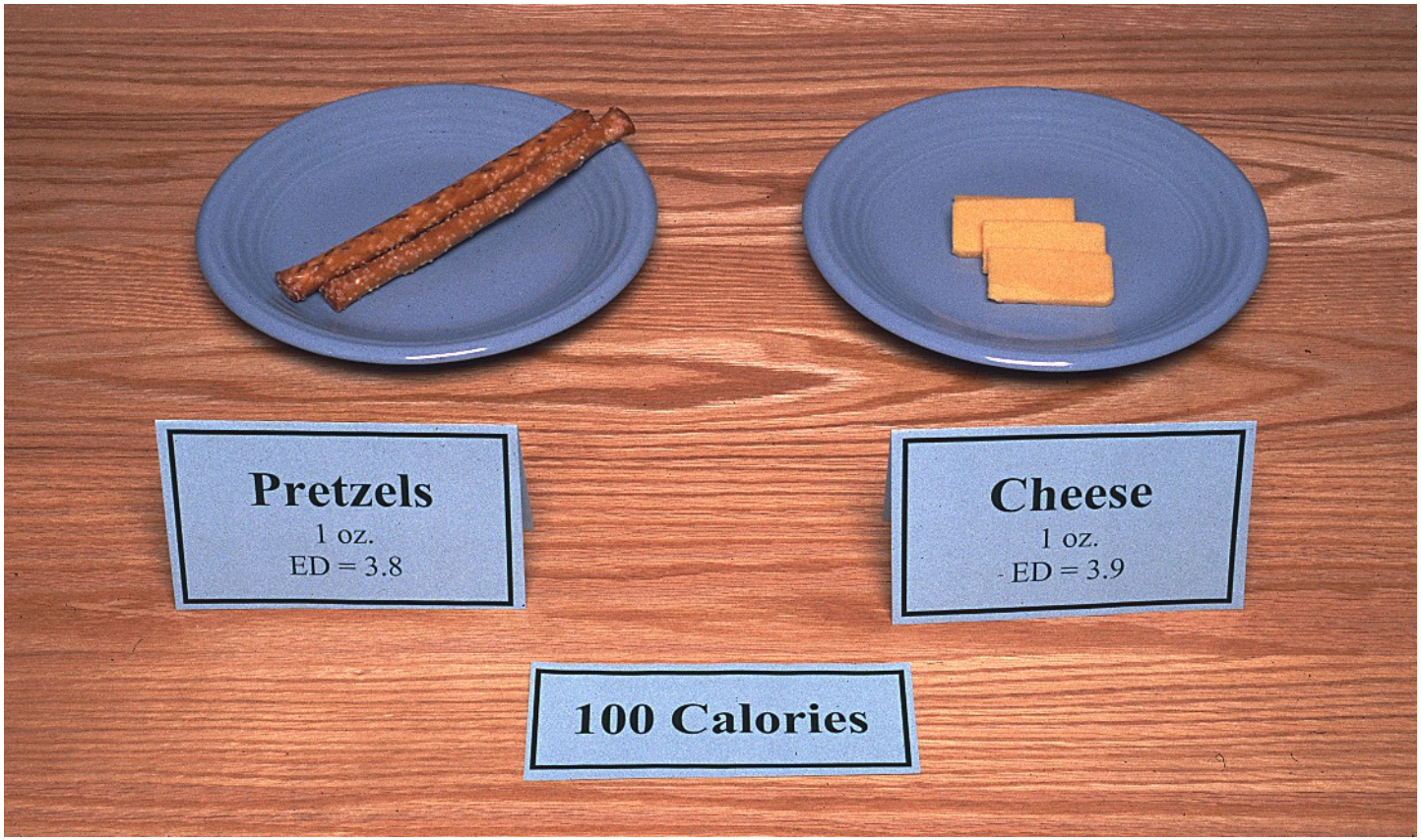
How water can influence the energy density of food



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Effects of water as a beverage or in food on intake

Rolls et al., Am J Clinical Nutrition, 70, 448-455, 1999

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Lower Energy Density: Bigger Portion, Fewer Calories

Low ED Sandwich (429 calories)
ED= 1.7 cal/g
• 2 slices whole wheat bread
• 2 oz. low-fat roast beef
• 1 oz. reduced-fat cheese
• 1 piece lettuce, 1 T. alfalfa sprouts
• 2 slices tomato, 2 rings green pepper
• 1 tsp. light mayonnaise
High ED Sandwich (626 calories)
ED= 3.2 cal/g
• 2 slices whole wheat bread
• 2 oz. beef bologna, 1 oz. cheese
• 1 piece lettuce, 1 T. mayonnaise

Rolls & Barnett, The Volumetrics Weight-Control Plan, Quill,2000

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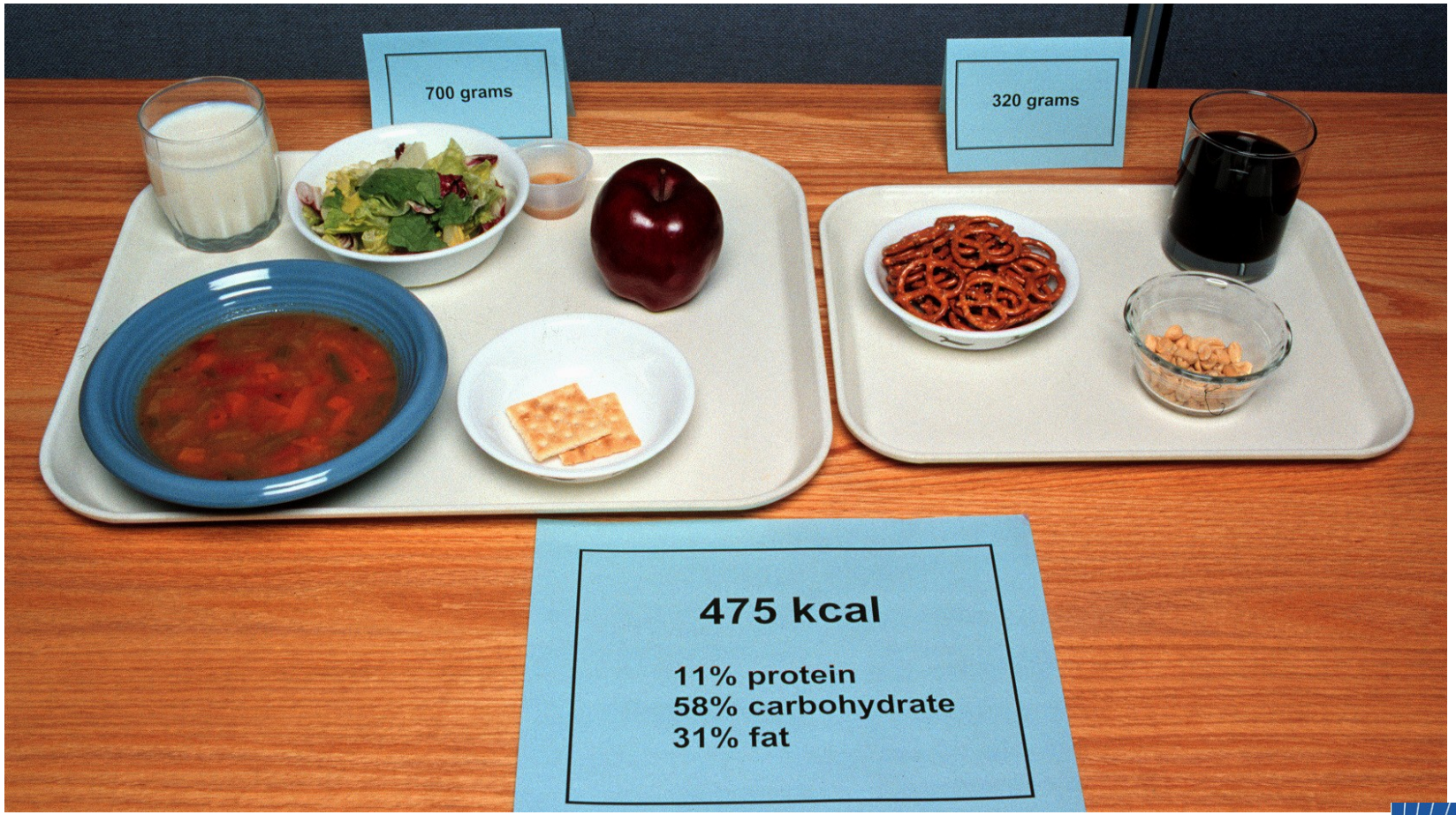
Same calories and % macronutrients:



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Overweight and Obesity - Fruits and Vegetables

The Caveats

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Caveats

- Form
- Preparation methods
- Comfort foods

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What does the evidence suggest?

- People must eat fewer calories than they expend to lose weight
- People may not limit what they consume based on calories alone.
- People can eat low energy dense foods in greater amounts than high energy dense foods for the same number of calories.

- Water and fiber ↑ volume and ↓ energy density. Fruits and vegetables are high in water and fiber

- Fruits and vegetables are good substitutes for high energy density foods

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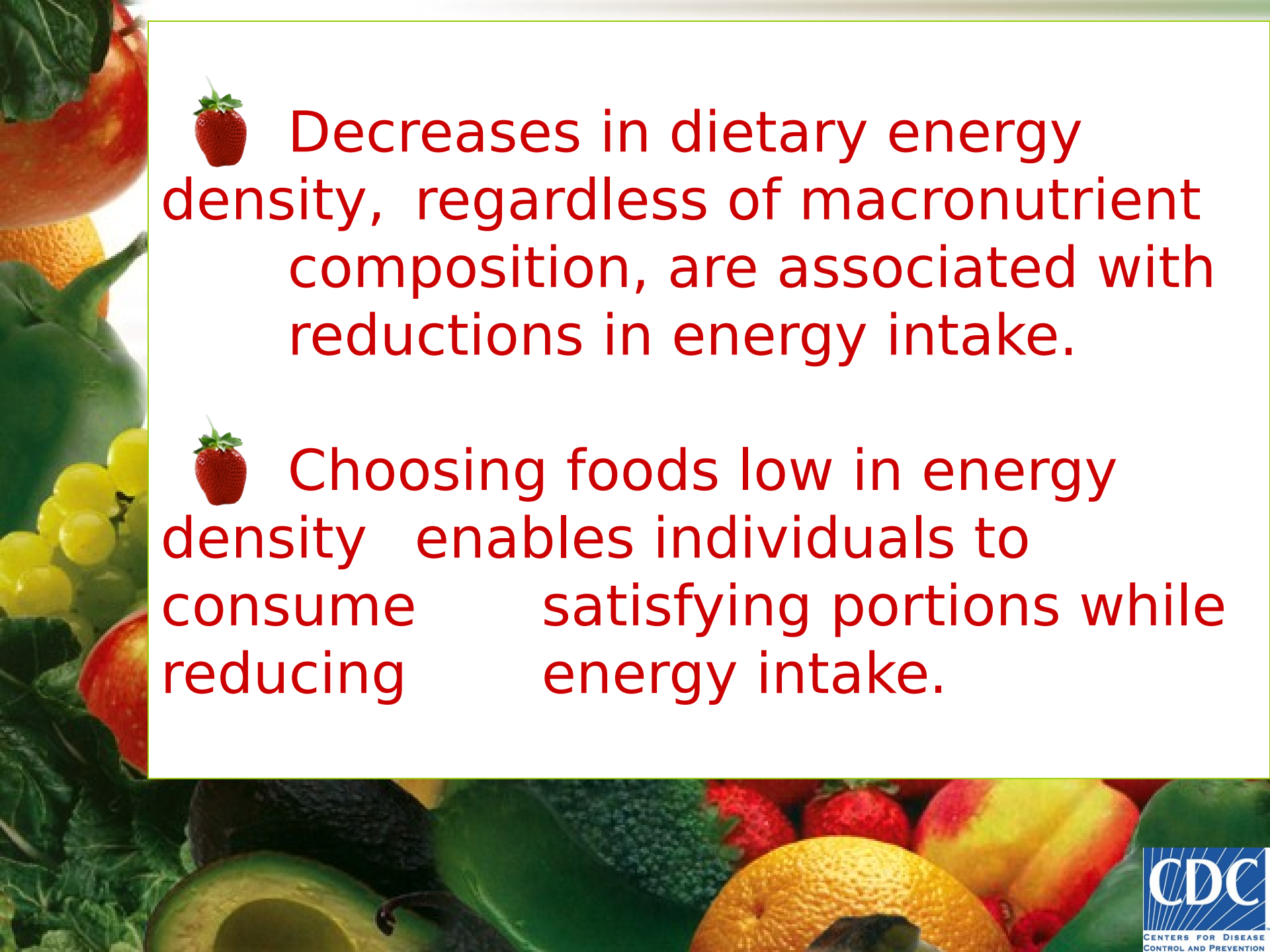
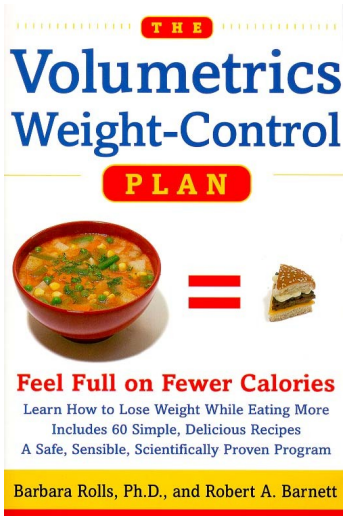
- Decreases in dietary energy density, regardless of macronutrient composition, are associated with reductions in energy intake.

- Choosing foods low in energy density enables individuals to consume satisfying portions while reducing energy intake.



Tools, Resources and We



The Volumetrics Weight-Control Plan
Feel Full on Fewer Calories
Authors: Ph.D. Barbara J. Rolls , Robert A. Barnett
Released: 05 December, 2000
ISBN: 0060932724

CDC's 5 A Day Web www.cdc.gov/5aday

5 A Day

- Overview
- What is 5 A Day?
- Background
- Data and Statistics
- Research
- Campaigns
- For Coordinators
- Fruit and Vegetable of the Month
- 5 A Day Links
- Frequently Asked Questions (FAQs)

Fruits and Vegetables of the Month

January		February		March	
Onion	Papaya	Beans	Avocado	Passion Fruit	Mushrooms

April		May		June	
Artichoke	Berries	Rhubarb	Gooseberries	Radish	Melon

July		August		September	
Cucumber	Cherry	Lettuce	Plum	Eggplant	Pomegranate

October		November		December	
Cauliflower	Pear	Sweet Potato	Kiwi	Brussels Sprouts	

Lettuce Hear From You!

For additional requests for 5 A Day information, comments about this site, or to change the information on our coordinator contacts contact us.

Coordinator Web Board

The 5 A Day Coordinator Web board is a forum to exchange ideas, opinions, and information about the 5 A Day program. Only 5 A Day coordinators and partners will have access to the Web Board. We encourage you to use this Web Board as it will be the preferred method of communicating with you about 5 A Day activities.

Interested in joining in on the conversation? Join our web board by sending an e-mail to: 5adaywebboard@cdc.gov. Be sure to include all your contact information in the e-mail. You will receive a welcome message and your temporary password within 48 hours.

If you already have a username and password you can access the Web boa

Savor the Spectrum

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Did you know?

Thomas Jefferson brought the first eggplants to the U.S.

www.foodreference.org*

RECIPES

Healthy recipes that promote eating 5 servings each day. And remember, five is the recommended minimum — the more the better!

See the recipes

Audio Clips

Listen to some of the public service announcements playing on radio stations across the country!

Listen now

Consumption of 5+ vegetables and fruits per day
Florida — Body Mass Index